At the meeting on April 7, Dr. A. S. Langsdorf, of Washington University, delivered an address on Electric Waves, the explanations being illustrated by experiments, including some of the phenomena of self-induction, absorption, reflection and resonance.

Dr. H. von Schrenk exhibited a sample of the impregnated wooden paving blocks used on some of the streets of London and Paris.

One person was elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

SECTION D, MECHANICAL SCIENCE AND ENGINEERING OF THE AMERICAN ASSOCIATION.

THE next meeting of the American Association occurs at Pittsburg, June 28–July 3, of this year.

The various Carnegie and Westinghouse industries and a host of others in and about Pittsburg make this locality probably the most interesting in engineering lines in America. Admission to some of these plants is, under ordinary circumstances, difficult to secure. But strong local committees of influential men will do all that can be done to give visitors entrance wherever desired on the important occasion of the coming meeting. Local conditions, therefore, should make Section D, devoted to 'Mechanical Science and Engineering,' the most prominent of the Association.

It will have the active cooperation of the Engineers' Society of Western Pennsylvania —a powerful organization of 404 members. Prominent investigators in various parts of the country have already signified their intention to participate.

The order for the week will be short, crisp, pithy papers for the morning sessions and carefully planned educational excursions under competent local leadership for the afternoons.

This notice is sent out to engineers everywhere and a cordial invitation is extended to them to send to the secretary as soon as convenient titles and abstracts for the morning programs.

The American Association opens at Pittsburg on Saturday, June 28. On Thursday, Friday and Saturday of the same week the Society for the Promotion of Engineering Education will also meet in the same city. A rare series of meetings is in store, therefore, for those who attend, and it is hoped that very many engineers will put Pittsburg on their summer schedule. Please remember to send titles and abstracts very soon to the secretary.

J. J. FLATHER, *Chairman,*
C. A. WALDO, *Secretary.*

LAFAYETTE, INDIANA.

SECTION A, MATHEMATICS AND ASTRONOMY.

Members of the Association who will have papers to present before Section A at the Pittsburg meeting, June 28–July 3 next, are requested to send the titles of such papers as soon as possible to the Secretary of the Section.

EDWIN S. CRAWLEY.

UNIVERSITY OF PENNSYLVANIA.

CENTRAL CONTROL OF THE EXPERIMENTAL STATIONS.

THE article on the above subject by H. F. Roberts, in a late issue of SCIENCE, urges a point of view in some respects plausible, but not, I think, in accord with the best interests of either the scientific or the practical aspects of the station work; unless it be from the standpoint of the trite saying that the best government would be that of a wise and benevolent despot. And surely, if it is bad for the West to have stations established ten or seventy miles apart, it is worse for the East, where the stations, *e. g.*, of the New England states, and of Delaware, Maryland and New Jersey, are located so closely together within a remarkably uniform climatic region, while similar distances on the Pacific slope will often involve the most startling climatic contrasts. By parity of reasoning, the central authority called for ought to abolish and redistribute a dozen of these stations of the Atlantic coast region; and logically, the abolition of 'Little Rhody' and similarly small states, which are exceeded in area by many single counties in the West, should follow in due course, the political preponderance given them at present being clearly unfair.

Robert's fundamental idea, that stations should be located so as to represent climatic

and soil regions instead of state lines, is undoubtedly correct, and there is no excuse for the close proximity of the Washington and Idaho stations, as there is plenty of elbow-room in both states. The local and political 'pulls' exerted for the location of stations, without reference to fitness, is unquestionably a crying evil. But the same applies to a hundred other subjects of state legislation, including normal schools, asylums of all kinds, and even penitentiaries. The taxpayers' money is wasted in these useless duplications; and all this could be avoided if we had the wise and benevolent despot, who would arrange and handle these matters in accordance with common sense, economy and 'the greatest good to the greatest number.' But, until we find that highly gifted person, we must submit to what is simply a part of the price we have to pay for democratic institutions.

It is, or assuredly should be, one of the main objects of the stations to investigate, first of all, the problems that interest their respective constituencies. The fact that they are partially dependent for their income upon state appropriations is a wholesome admonition to conform to this reasonable expectation; on the other hand, the supervision of the national Department of Agriculture is an equally wholesome restraint upon improper use of their funds. But that Department has not now, and will not have for a long time to come, the intimate knowledge of the entire enormous area of the United States that would be necessary to determine advisedly the best direction to be given to the energies of each of the numerous stations. However well assured we may be of the benevolence of the Department, it has not had the time or means to acquire the wisdom which is the other necessary postulate of the good despot. Those whose work is done thousands of miles away from Washington have reason to know this; *e. g.*, it is only within the last few years that the necessity of having seeds to be tested in California, on hand by the middle of January at the latest (and in many cases by the first of October), has been appreciated and acted upon at the national headquarters, although the present writer had made annual representations to that effect for over twelve years. The usual quadrennial changes in the Secretaryship of Agriculture render the recurrence even of this very infelicity (not to mention others) a contingency far from remote.

To quote the language of the excellent report of the committee on cooperative work between stations and the Department of Agriculture: 'Not only is the autonomy of the stations necessary for the fulfilment of their functions, but autonomy in scientific investigations is essential.' And to quote still farther, a late distinguished visitor from Europe said that 'the danger of republics is corruption; that of monarchies is routine.' The present organization of the stations seems to me to provide against both, as far as is practically feasible. The mislocation of stations will in time cure itself, at the expense of the sinning states, who are bound to keep the federal or 'Hatch fund' intact; and meanwhile there is plenty of work to do for even such stations right where they are. Nay, if we are to take the dicta of some of our eastern station men literally, it should make little difference where they are located, so long as they are to confine themselves to the expansion of the '*science* of agriculture' only. Fortunately, few of the western stations have held this view, and fewer have acted upon it. With a multitude of new practical problems before them, and a constant demand for information involving a knowledge of local conditions in unexplored territory, a policy differing in important points from that of eastern and European stations becomes a necessity; and while the Department at Washington may justly object to having the 'Hatch fund' so subdivided among regional substations as to become inefficient for good work, the need of these substations is nevertheless felt by all workers where, as in a large portion of the West, cultural conditions are more radically different within short distances than is the case anywhere between the Atlantic seaboard and the Mississippi. The state stations are naturally in the best position to know and appreciate these differences, and can most intelligently act upon them; while there is no organized instrumentality whereby the Department at

Washington could acquire such knowledge. Much can be done by cooperation, so long as this does not degenerate into invidious competition; but the autonomy and initiative of the stations are assuredly the best means of maintaining their usefulness to the people of their several states, and to the progress of agricultural science in its widest sense, viz., its application to the actually existing conditions, even though these may appear 'abnormal' to the dwellers in the temperate humid regions where that science has been first developed.

E. W. Hilgard.

University of California,
March 24, 1902.

THE SUBMARINE VALLEYS OF THE CALIFORNIA COAST.

In Science for January 10, Professor Wm. E. Ritter, reporting the dredging work done last summer off the coast of southern California, states that 'the bottom deposits of some, at least,' of the submarine valleys which characterize the California coast, 'even at a distance of several miles from shore, are of a character to prove that close inshore material is carried into them in large quantities.' And to him this 'observation suggests, though of course does not prove, that the valleys are natural channels through which currents flow, at times, at least, from *the shore out to deeper water.*'

On entirely different grounds, the present writer had reached a somewhat similar conclusion—that the majority of the submarine channels of the California coast have been formed, or are at least kept open, by some cause now in operation, and that cause coastal currents. These views and the reasons for them were given by the writer in a paper read before a meeting of some members of the U. S. Geological Survey, about a year ago; they can be only briefly outlined here.

The mature Coast Ranges of California, taken as a whole, lie close to and parallel with the coast line, and the coastal topography is therefore rugged. As the larger stream courses follow the trend of the ranges and the coast for long distances, there are few coastal breaks of importance. Fringing this rugged coast and the coastal islands is a narrow submarine terrace or platform, the 'continental shelf,' which has been formed mainly by marine abrasion, and whose outer margin is marked approximately by the 100-fathom submarine contour. Its width ranges from a minimum of about a mile to a maximum of about thirty-two miles, the average being between five and ten miles. The submarine valleys (of which between twenty-five and thirty have been described along the Pacific coast of California and Lower California) notch this terrace and its outer escarpment. The valleys, for the most part, begin at or near the shore line and continue to depths ranging from about 400 feet to more than 3,000 feet, the majority descending to at least 2,000 feet. Most of the valleys follow a course roughly at right angles to the shore. Their forms are both simple and branched. Some of them head opposite the mouths of large valleys on the land, and some opposite abrupt and rugged portions of the coast, where there is no break in the Coast Ranges. The valleys in general are quite open, none of them being 'chasm,' as is frequently supposed. This may be easily seen in the cross sections of the valleys. While the general slope of their walls differs considerably, in any given case it is comparatively gentle, taken as a whole. Two cases of unusual steepness have an angle of only about 20°, while the maximum angle measured was about 31°, in Cape Mendocino valley. The grade (profile) of the valleys is considerably greater than that of the lower parts of the larger coastal valleys. Vincente valley, from the shore line to a depth of 1,800 feet, has an average grade of about 260 feet to the mile, while the grade for the first quarter-mile from shore is about 720 feet to the mile.

Two explanations of these submarine valleys have been proposed: one that they are structural in origin (Lawson); the other that they are submerged stream valleys (Le Conte, Fairbanks, Davidson).

There can be little doubt that *some* of the valleys are due to coastal deformation; but this interpretation is unsatisfactory in accounting for the majority of them, for the following reasons: